

## **REPORT OF REVIEW TEAM ON DOE O 461.1**

**Directive Number and Title:** DOE O 461.1, Packaging and Transfer or Transportation of Materials of National Security Interest (being revised as DOE O 461.1A)

**Originating Office:** NNSA's Office of Defense Programs, Office of Tritium Production and Materials Management (NA-125)

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### **Background**

1. Why, when, and how was the order and its contractor requirements document established?

Defense Programs issued this order, the contractor requirements document (CRD), and manual on September 29, 2000 to combine two predecessor orders<sup>1</sup> issued in 1993 and 1994 into a single order. The order and manual cover packaging and transportation, onsite or offsite, of weapons program-related components and hazardous materials and materials of national security interest. The order also provides for DOE's management of the DOE secure transportation system operated entirely by federal personnel.

The CRD, which reduces the requirements of the order to actions required by the DOE contractor, was prepared in conjunction with the order and contains 19 actions to be performed including submission of documents for DOE approval. The contractor must submit an implementation plan for DOE approval which details the actions the contractor must take to comply with the CRD, a schedule for their implementation, a quality assurance plan, and a DOE-approved onsite packaging and transfer procedures manual prepared according to the requirements in the manual accompanying the order.

2. What major modification and recent updates have been made?

NNSA recently sent a revision of the order and CRD to the RevCom system. The major change affecting contractors is a new requirement to seek DOE approval before contractors can drive government-owned vehicles offsite, a practice becoming more common with decreased availability of the secure transportation system. This requirement ensures that the Department of Transportation (DOT) regulations or their equivalent are being followed.

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<sup>1</sup>DOE O 5610.12, Packaging and Off-site Transportation of Nuclear Components and Special Assemblies Associated with the Nuclear Explosive and Weapon Safety Program (7/26/94) and DOE O 5610.14, Transportation Safeguards System Program Operations (5/12/93).

The CRD is not affected by additional proposed requirements to:

1. Transfer authority to certify packaging to NNSA for all packages for shipment of NNSA-owned or -controlled radioactive or fissile materials (currently in 460.1A under EM-5) and provide for reciprocity for use of any DOE-certified package:
2. Submit forecasts of quarterly shipping requirements for movements via the Transportation Safeguards System (TSS) (required forecasts cover different periods including ten years, two years, as well as 60 days and 30 days prior to shipment); and
3. Transfer responsibility for biannual assessment of national security packaging and shipment operations from the Manager, Albuquerque Operations Office, to the Assistant Deputy Administrator for Military Application and Stockpile Operations (NA-12).

### Overview of Requirements

1. What is the order's purpose and how is it accomplished?

The order's purpose is to establish requirements and responsibilities for the packaging and transportation of naval nuclear fuel elements, Category I and II special nuclear materials, nuclear explosives, nuclear components, special assemblies and other materials critical to the maintenance of the nuclear weapons stockpile and other national security programs which involve use of these materials. The movement of these materials is usually conducted via the DOE-operated Transportation Safeguards System (TSS), which provides armed, highly-trained federal agents as escorts and requires the use of specialized vehicles for both transport of materials and the escorts. The transportation capacity of this system is limited by the numbers of personnel and specialized vehicles available. Thus, the requirement for schedules, both of package availability and transport availability, is critical to achievement of NNSA program milestones as well as other DOE program objectives such as the removal of fissionable materials from those DOE sites scheduled for closure.

The purpose of the order is accomplished by setting out requirements for package certification and onsite and offsite transportation of national security materials described above. It requires either strict compliance with DOT regulations or submission of packaging and transportation procedures to DOE for approval that show protection equivalent to DOT regulations. It also references safeguard requirements and provides for the Deputy Administrator for Defense Programs to grant exemptions when they are deemed necessary and do not present undue risk.

2. What is the CRD's purpose and how is it accomplished?

The CRD's purpose is to translate the requirements of the order into required contractor actions. The purpose is accomplished by assuring that all of the order's requirements which concern action to be performed by contractors are present in the CRD. The contractor is usually the applicant for a package certificate and must design the package, test it, and prepare the Safety

Analysis Report for Packaging (SARP) or Transportation System Risk Assessment (TSRA) for review by the NNSA certification authority. The contractor prepares the packages, performs radiological surveys, ties packages down in the transport vehicle, and directs or performs onsite transfers. The contractor also prepares shipments for offsite transportation by the secure transportation system. Thus, the CRD requirements are crucial for maintaining safe and secure movement of national security materials. The manual associated with the order contains detailed requirements for contractors to submit a set of procedures for onsite packaging and transfer to DOE for approval. The current Appendix A to the manual is intended to be designated as the CRD to the manual.

### Analysis

1. Do we still need to apply the Order to contractors?

Yes, the order is necessary to accomplish the packaging and transportation of national security materials in a safe and secure manner onsite and offsite. It provides for protection of the health and safety of the public, workers, and the environment arising from these transportation and packaging activities. While DOT regulations would normally apply to transportation in commerce offsite, they do not apply to transportation of national security materials<sup>2</sup> or to activities performed by federal or state government personnel. For these offsite exempt operations as well as onsite transfers, there is a need to establish standards for transportation. This order implements DOE policy by order and contract to require that DOE and its contractors provide a level of protection of transportation and packaging onsite and offsite that is substantially equivalent to or identical to DOT packaging and transportation regulations. DOE's credibility with the public for safe transportation depends on meeting the public's expectation that DOE will apply the standard DOT regulations applicable to industry and commercial entities as standards at its own sites.

2. If so, are there attentive less bureaucratic approaches?

No. This order was reviewed by all field elements prior to its publication in 1998 and no comments remained unresolved at the time of its publication. The review team considered the comments from the field although most comments were cursory and not helpful. Less than half of the sites made comments on the three transportation orders.

The transfer of authority from EM-5 to NNSA to certify certain packaging for NNSA materials and to allow reciprocity to use any certified package should be scrutinized in the current two revised orders addressing this issue (461.1 and 460.1A). The transfer would allow contractors to seek certification from either EM-5 or NNSA and reciprocity to allow use of any certified

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<sup>2</sup> 49 C.F.R. 173.7(b) ("Shipments of hazardous materials, made by or under the direction or supervision of DOE or DOD, for the purpose of national security, and which are escorted by personnel specifically designated by or under the authority of those agencies, are not subject to the requirements of this subchapter [C].").

packaging. This sharing of responsibilities could lead to increased flexibility and efficient use of resources. Conversely, it could also encourage forum-shopping for certification from the program more likely to grant it with certain conditions. It could also lead to more duplication of personnel, equipment, and procedures to the extent they are not already the same under both programs. If this transfer becomes final, the procedures, standards, and terminology should be clear and consistent between the two orders (see recommendation for consolidation below). In addition, if the certification authority of EM-5 is transferred to the NRC, DOE needs to provide for an orderly transition to handle pending requests for certification and to continue existing certifications.

This order allows exemptions separate from the directives system. Generally, orders should use the standardized directives system process except in special cases. In transportation activities, specialized procedures may be necessary to harmonize exemption terms and conditions on both the shipping and receiving ends. Other exemption-like processes such as waivers, variances or alternatives should be labeled and treated as exemptions. Requests for DOT exemptions are different, however. While DOE cannot approve these requests, it can and often does require them to be submitted to and approved by DOE before final submission to DOT.

The order requires too many types of implementation plans and procedures that contractors must submit to DOE for approval. The plans should be consolidated with the plans and procedures of the other two transportation orders. Such a change would reflect the practice at most sites of each contractor having only one set of transportation and packaging procedures. Plans should also be incorporated into other existing site-wide plans such as integrated safety management system descriptions, safety basis analyses, quality assurance plans, and worker protection implementation plans.

Requirements should be eliminated where they overlap with the new nuclear safety rules in 10 C.F.R. Part 830. Most orders were written before DOE adopted the new safety basis rules and amended the quality assurance rules in 2001. The requirements cannot be eliminated altogether, however, since Part 830 excludes any activities regulated by DOT. Also, the safety basis portion of Part 830 only applies to hazard categories 1, 2, and 3 nuclear facilities and activities, which includes transportation and packaging activities. Moreover, redundant requirements in the order with the worker protection rules in Part 835 and other DOE orders such as training and lessons learned should be deleted. With respect to quality assurance, redundant or invalid references to NRC regulations, DOT regulations, and DOE orders should be deleted.

The application is not overly broad. This order applies to any onsite or offsite packaging and transportation of specified weapons materials and nuclear components, explosives, and national security materials. It provides packaging certification authority for packages used for these materials. The revision will recognize NNSA certification authority for packages for Type B and fissile materials. In general, the three current transportation orders and two manuals have a confusing inter-connection of applicability and exceptions provisions which must be clarified, e.g., whether provisions apply onsite or offsite, involve national security, involve commercial

contractors or public agency contractors, involve shipments in commerce, are subject to DOT regulations or to DOE nuclear safety rules.

3. Are there any other useful changes to the contractor requirements document?

Changes may be needed as stated above on exemptions, applicability, implementation plans, standard definitions, terminology, and Part 830 consistency. The detailed requirements in the manual need to have a CRD developed which should be sent through RevCom (Appendix A is proposed to be designated the CRD). The plans and procedures required by the manual should be simplified and integrated with other plans. Some provisions could best be moved to a guidance document rather than as requirements in the order and manual. Moreover, the order should make definitions a separate section so they can be used with both the CRD for the order and manual.

### Summary Recommendations

2. **Continuance.** The requirements in the CRD are necessary to ensure the contractor knows DOE's compliance expectations for packaging and transportation requirements for national security and nuclear weapons materials.
3. **Consolidation.** This order should be substantially revised in the short-term. In the long term, it should be consolidated into one order with the two other transportation and packaging orders. The team believes that a consolidation of the three orders is the long-term solution to eliminate the confusing areas of duplicate requirements because of the overlapping applicability provisions, and the profusion of plans and procedures that must be prepared for DOE approval. A single order would have the advantage of providing one set of procedures, standards, and terminology. In the short term, however, the three orders are in various stages of the RevCom process. The team believes that consolidation at this time would delay the revision of the three orders and issuance this spring. Consolidation would take months if not years. Moreover, consolidating the orders across program lines could raise additional issues since the orders belong to two different programs, EM and NNSA. Thus, for now, the three originating programs believe they can and are committed to working together closely to ensure the orders dovetail precisely and that required plans and procedures are integrated together.
3. **DOE Standard for Onsite Transport.** The order should adopt a new performance-based standard for onsite transportation and packaging to provide a level of protection that is substantially equivalent to or identical to that provided by the DOT regulations for transportation in commerce. As an option, the order could also require a DOE-approved description of the procedures developed to implement the standard.

Generally, DOE contractors performing packaging and transportation activities in commerce are subject to DOT hazardous material regulations including any pre-transportation functions to prepare shipments for transportation that are performed onsite.

Those entities are subject to the jurisdiction of DOT including enforcement by DOT personnel.

Certain of these entities are not subject to these DOT regulations for offsite activities. These include federal, state or local government employees transporting hazardous materials solely for noncommercial governmental purposes. For DOE operations, these include the University of California and other state universities, the DOE national security transportation program, and DOE employees. As a matter of policy, DOE believes these entities should follow the DOT regulations offsite. Thus, DOE imposes on these entities DOT regulations as a matter of policy by DOE order for DOE employees and by order for DOE contractors as incorporated into contracts. These offsite activities (including pre-transportation activities performed onsite) are subject to DOE enforcement by contractual mechanisms, however, and are not subject to DOT enforcement.<sup>3</sup>

In contrast to offsite transportation activities, DOT regulations do not apply to the transfer of materials onsite. DOT regulations do not apply to any intra-facility movements of hazardous materials that take place entirely on property where public access is denied or restricted. For these onsite activities, the current orders implement DOE's long-standing policy of imposing DOT or equivalent regulations on onsite transfers. DOE has apparently believed that its credibility with the public for safe transportation depends on meeting the public's expectation that DOE will apply the DOT regulations as standards for transfers onsite as well.

Consideration should be given, however, to changing the standards for onsite transportation and packaging in the DOE orders to a more performance-based standard. This would allow development of risk-based standards rather than adherence to the DOT how-to regulations, which are quite prescriptive and which were designed for offsite commercial purposes.

DOE and its contractors should be subject to the same standards for intra-facility transfers as are other commercial sites such as chemical plants. Those industries are not required to follow these prescriptive DOT regulations for intra-facility transfers. Even though private sites are not subject to DOT regulation, they are regulated by OSHA, EPA, and other agencies.

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<sup>3</sup> DOT is proposing to amend its hazardous materials regulations to clarify long-standing confusion concerning the definition of pre-transportation activities such as loading, unloading, packaging, marking, and storage. The rule would also clarify applicability to governmental agencies such as DOE contractors that are state agencies. It would reflect the Informal Interpretation that DOT issued to DOE on June 3, 1993 that transportation and packaging in commerce offsite performed by state agencies and onsite regulation and enforcement should be under contractual control and enforcement of DOE. See 66 Fed. Reg. 32419, 32431, 32446 (June 14, 2001) (DOT notice of proposed rulemaking).

Similarly, DOE and its contractors should not have to rigidly follow DOT regulations or to provide a plan showing equivalence with every DOT regulation for onsite activities. In fact, application of the DOT standards to onsite shipments can increase cost of packaging and transportation and can impose standards that in no way increase the safety of movement of the cargo. An outcome-based standard based on the identified hazards and risks of the work would be more efficient and provide equivalent safety.<sup>4</sup>

A new performance-based standard in the orders might read as follows. Under such a standard, DOE and its contractors:

- (1) Must provide a level of protection for transportation and packaging intra-site that is substantially equivalent to or identical to that provided by the DOT regulations for packaging and transportation of hazardous materials based on the work and the hazards; and
- (2) (optional) Prepare and submit to DOE for approval a document describing the procedures developed and implemented to provide such an equivalent level of protection.

This performance standard could be met by demonstrating an equivalent level of protection without having to show equivalence with each detailed DOT requirement.

Similar to the private sector, DOE would not need to impose DOT standards by contract because DOE already imposes environmental, health and safety standards by other orders and regulations. These include DOE O 440.1 to cover industrial safety and health in the OSHA area, DOE O 414.1 for quality assurance, and similar orders. Moreover, for DOE's more hazardous facilities, DOE recently adopted significant nuclear safety regulations including Part 835 for worker radiation protection, Part 830 Subpart A for Quality Assurance, and Subpart B for Safety Bases. For nuclear facilities and activities that are subject to the DOE nuclear regulations, transportation and packaging activities are clearly intended to be covered to the extent that they are not under the legal jurisdiction of DOT.

Indeed, changing the standard for onsite packaging and transfer to a standard that is more hazard-based and less closely aligned with DOT how-to requirements, would make this order more performance and outcome-based. This change would also have the effect of making the order more compatible with its permitted use as a documented safety analysis for the safety basis in Part 830. At recent conferences, interpretation issues have arisen concerning the lack of correspondence between the DOT regulatory scheme and the safety basis requirements of the nuclear safety regulations.

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<sup>4</sup> For example, a package suitable for moving material from one building to another onsite might require only a six foot drop test certification as compared to a 30 foot test required by DOT for transportation in commerce.

Minority Views - none

Originating Office Comments

No recommendations for substantive change are made to the CRD. Only minor changes to the CRD are suggested such as combining the previous 13. and 14. into a single requirement. The reference to the NRC's quality assurance requirements Subpart H in paragraph 4.b. and the CRD has been deleted as inconsistent with DOE's quality assurance order and regulations.

The order and its associated manual were developed by a working group which included representatives from DOE Headquarters, DOE Field Elements, contractors and the Defense Nuclear Facilities Safety Board over a period of more than three years. All comments were resolved. The approval of contractor plans by the appropriate federal oversight element is necessary, whether or not the contract is performance-based. This order is process-based and its requirements cannot be based on outcomes.

The implementation plan required in the CRD is necessary to permit each contractor to measure its current state of compliance with the order requirements and to inform its oversight elements regarding its compliance and its plans to meet all applicable requirements. The implementation plan will also identify those requirements which are not currently applicable to site operations.

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February 6, 2002 send comments to J. Helfrich, 6-4218, GC-52, and Bob Webb, ME-61,6-8264*



**General comments on directives system -- Amended January 16, 2002**

RE: New attachment to order reports on DOE packaging and transportation orders 460.1A, 460.2, 461.1

**Standards for on-site transportation and packaging**

DOE contractors performing transportation activities offsite in commerce are subject to DOT regulations including any pre-transportation activities to prepare shipments for transportation offsite to the extent that DOE considered those activities to be in commerce. Those entities are subject to the jurisdiction and enforcement under the DOT regulations.

As a matter of policy, certain other entities performing similar work of offsite transportation in commerce and pre-transportation activities are exempt from DOT regulations but DOE believes they should be following the same DOT regulatory scheme. These exempt entities include state governmental agencies such as the University of California, the national security transportation program, and DOE employees, DOE imposes these DOT regulations voluntarily by DOE order as incorporated into contracts. These are subject to enforcement by DOE through contractual mechanisms and are not subject to DOT enforcement

For all other packaging and transportation activities involved in the transfer of materials onsite, a performance standard could apply. Consideration should be given to changing the standards for onsite transportation and packaging in the DOE orders. The current orders, however, follow DOE's long-standing policy of following DOT regulations intended for offsite commercial purposes, to be used for transfers onsite, including packaging. DOE has apparently believed that DOE's credibility with the public for safe transportation depends on meeting the public's expectation that DOE will apply the standard DOT regulations applicable to industry and commercial entities as standards at its own sites.

Instead, DOE contractors should be subject to the same standards for onsite transfers as are other large commercial sites such as chemical plants. Those industries do not have to follow DOT regulations onsite and thus DOE contractors should not have to follow DOT regulations or provide a plan showing equivalence with every DOT regulations. Instead, DOE contractors could be required to generally adopt and implement the following performance standard. Such a substitute might read as follows:

Contractors must provide a level of protection for transportation and packaging onsite that is substantially equivalent to or identical to that provided by the DOT regulations for packaging and transfers onsite; and (optionally)

Prepare and submit to DOE for approval a document describing the procedures developed and implemented to provide an equivalent level of protection (equivalent of Transportation Safety Document (TSD) in DOE O 460.1A, and documents in 461.1).

This performance standard could be developed from the bottom up to show an equivalent level of protection without having to show equivalence with each single DOT requirement from the top down. This approach may be appropriate because it would be closer to the private sector practices. In the private sector, sites are subject to OSHA and EPA regulations. Similarly, DOE imposes ES&H standards by order such as DOE O 440.1 to cover industrial safety and health in the OSHA area. Moreover, for DOE's more hazardous facilities, DOE now has adopted significant nuclear safety regulations including Part 835 for worker radiation protection; Part 830 Subpart A for Quality Assurance, and Subpart B for Safety Bases. For the facilities subject to the DOE nuclear regulations, the onsite transportation and packaging activities are clearly covered.

This standard for onsite packaging and transportation would only apply to the onsite transfer of materials. It would not cover any activities related to the offsite regulation (either by DOT or by DOE contract) involved with transportation offsite in commerce.

Further discussion:

For offsite transportation, activities are regulated in two groups: (1) those commercial carriers and contractors directly subject to the jurisdiction of DOT regulations and DOT enforcement, and (2) those governmental contractors and DOE personnel that are not directly subject to DOT regulations. For the second group, DOE has adopted a policy of voluntarily following DOT regulations and providing that those DOT requirements or their equivalent will be met. DOE reflected this policy in its DOE orders which are imposed on DOE personnel and governmental contractors by contract, subject to enforcement under the DOE contract. This group is not subject to DOT enforcement.

Note that DOT's hazardous materials regulations for offsite transportation and packaging activities may reach back into certain activities actually performed onsite. These may include pre-transportation activities such as loading, unloading, packaging, marking, and storage of materials in preparation for offsite transportation in commerce. (DOT is currently seeking comments on a proposed rule to clarify the long-standing confusion in the defining which pre-transportation activities are subject to the hazardous materials regulations. See 66 Fed. Reg. 32419 (June 14, 2001) (NOPV).

In this respect, onsite would mean those transfers (including packaging) taking place on site which are not "pre-transportation" activities undertaken in preparation for offsite, commercial transportation in commerce. For those pre-transportation activities as well as the actual transportation itself, DOE contractors who are not governmental agencies would still be required to follow the DOT regulations.

In those instances in which the DOE contractor is not legally under the DOT jurisdiction, such as the University of California, Iowa State University, and University of Georgia, DOE should continue to require by order in the contract, that these public entities must follow the DOT regulations for pre-transportation activities as well as the actual transportation in commerce

offsite. This, as pointed out in the Informal Interpretation issued to DOE from DOT (June 3, 1993), will be under the enforcement control of DOE, rather than DOT. In general, the current transportation orders manuals have a confusing inter-connection of applicability and exceptions provisions which must be clarified, e.g., whether provisions apply onsite or offsite, involve national security, involve commercial contractors or public agency contractors, involve shipments in commerce, are subject to DOT regulations or to DOE nuclear safety rules.

*Comments of Review Team Representative, Jeanette Helfrich, GC-52, 6-4218, January 17, 2002*

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